REMARKS:

1) The finality of the Office Action of June 2, 2004 should be withdrawn in view of the accompanying Request for Continued Examination (RCE).

2) The claims have been amended as follows.

The claims have been amended throughout by deleting the term "non-rigid" from the "tension-only connecting element" wherever necessary. The term "non-rigid" is regarded as unnecessary for properly defining the inventive subject matter, because the term "tension-only connecting element" is clearly defined and readily understandable by a person of ordinary skill in the art.

A few further editorial amendments have been made throughout the claims wherever applicable, to further improve the US claim style and terminology in comparison to the original claims, which were a literal translation of the counterpart PCT international claims and did not adhere to US standard practice.

Claim 21 has been amended to recite that the joint of the third joint set (109) is not located at a corner of the module, and that the guide mechanism comprises scissors arrangements (e.g. with scissors joints 127 to 134). These feature have original non-limiting support in the drawing figures (e.g. Fig. 3), in claims 28 and 29 regarding the scissors arrangements, and in the specification at page 7, lines 1 to 3; page 15, lines 22 to 26; and page 18, lines 1 to 8; for example.

Claims 26, 27 and 40 have each been amended into independent form by incorporating the features of prior parent claim 21 and any intervening claim as applicable.

Claim 42 has been amended to make clear that there are actually at least two tension-only connecting elements that connect the third joint respectively with at least two selected joints. The amendment also makes clear that the third joint is not located at a corner of the module, and that the at least two selected joints to which the third joint is connected include at least one of the first joints and a further joint. Still further, claim 42 has been amended to recite that the guide mechanism comprises scissors arrangements connected to at least some of the first and second joints. These clarifications are supported by the original context as well as the original drawings (see Figs. 2, 3), the written description (see page 6, line 10 to page 7, line 26; page 15, lines 22 to 26; and page 18, lines 1 to 8; for example), and the claims (see claims 28, 29, 43, 44).

Claim 47 has been amended to further recite that the fourth joint is displaced from the second surface on a side thereof facing toward the first surface, as clearly supported in the original disclosure of the fourth joint (122) being displaced from the second surface formed by the joints (101, 102, 113, 108) as shown in Fig. 3 of this application.

The present amendments do not introduce any new matter in view of the above mentioned original support. Entry and consideration of the claim amendments are respectfully requested.

3) Referring to the top of page 2 of the Office Action, the objection to alleged new matter in the Amendment of March 3, 2004 has been obviated by the cancellation of the alleged new matter from page 4 of the specification and the affected claims. It is not conceded that the terms "non-rigid" and "limp" are new matter, but rather these terms have simply been deleted because they are deemed unnecessary to properly define the invention in a clear and understandable manner. Thus, these unnecessary terms have been deleted to simplify and expedite the further prosecution of this application. The Examiner is respectfully requested to withdraw the objection, as it is no longer applicable.

4) Referring to the bottom of page 2 of the Office Action, the objection to the specification for failing to provide proper antecedent basis for the claimed subject matter is respectfully traversed. It appears that the Examiner has misinterpreted the disclosure of the present application.

It is **NOT** correct, as stated by the Examiner, that *"Only Figure 4 shows connecting elements that may be paired off as two parallel elements"*. In fact, Fig. 4 does not relate at all to the tension-only connecting elements that are each respectively embodied as two parallel wires or cables.

Instead, the Examiner's attention is directed to present Figs. 2, 3, 5 and 13 in connection with the written description at page 6, lines 6 to 10; page 15, lines 1 to 5; page 20, lines 18 to 22; and page 23, lines 7 to 11. Particularly, the

tension-only connecting elements are represented by the elements such as 39, 41, 43 and 45 in Fig. 2. These tension-only connecting elements are also clearly shown, but not numbered, in Fig. 3. The element (39) extends between the first set joint (114) and the third set joint (109). The element (41) extends between the first set joint (115) and the third set joint (109). The element (43) extends between the second set joint (113) and the third set joint (109). The element (45) extends between the first set joint (121) and the third set joint (109). Note that each of these elements (e.g. 39, 41, 43, 45) is represented in Figs. 2 and 3 as two thin parallel black lines with a narrow gap or white space therebetween. This is because each one of these elements (39, 41, 43, 45) comprises two parallel cables or wires, which are respectively represented by the thin black lines.

The tension-only connecting elements are shown in isolation, i.e. by themselves, in Fig. 5. Here also, note that the tension-only connecting elements of interest (39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67 and 69) are each shown by two thin black lines extending parallel side-by-side relative to one another. As mentioned above, these two thin black parallel lines represent two parallel cables or wires that respectively make up each one of the tension-only connecting elements of interest.

Fig. 13 shows an enlarged perspective view of a detailed portion of the arrangement of Figs. 2, 3 and 5, and particularly the arrangement of the joints (104 and 117) at the lower right center area of Figs. 2, 3 and 5. In Figs. 2, 3 and 5, note that

the tension-only connecting elements (51 and 57) extend from the joint (117) respectively to the joints (110 and 111). Those tension-only connecting elements (51 and 57) extending from the joint (117) are shown in detail in Fig. 13. Note that the connecting element (51) comprises two parallel wires or cables, and the connecting element (57) comprises two parallel wires or cables, as clearly evident in Fig. 13.

In view of the above discussed disclosure of the specification, especially as set forth at page 6, lines 6 to 10; page 15, lines 1 to 5; page 20, lines 18 to 22; and page 23, lines 7 to 11; it is respectfully submitted that the specification does provide proper antecedent basis for the claimed subject matter. Furthermore, it is clear from the specification that the tension-only connecting elements do not need to be made of steel, but rather could be made of any other suitable material (see e.g. page 6, lines 8 to 10). Thus, there is not a direct and strict linkage of using steel for tension-only elements on the one hand, or of using aluminum for tension-and-compression elements on the other hand.

The above cited portions of the specification in connection with Figs. 2, 3, 5 and 13 also facilitate an understanding of the present invention in general.

For the above reasons, the Examiner is respectfully requested to withdraw the objection to the specification as failing to provide proper antecedent basis for the claimed subject matter.

5) Referring to page 3 of the Office Action, the rejection of claims 21 to 48 as being indefinite under 35 USC §112, second paragraph has been obviated by the present amendment. Namely, the present amended claims no longer use the term "non-rigid". It is considered that this term is not necessary for properly and clearly defining the inventive subject matter. Regarding claims 46 and 48 directed to a tension-only connecting element comprising two wires or cables extending parallel to one another, the Examiner is respectfully requested to see the above discussion of drawing Figs. 2, 3, 5 and 13 in connection with the above-cited portions of the specification. Namely, Fig. 4 is not pertinent to the subject matter of claims 46 and 48. For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 21 to 48 as indefinite.

6) Referring to the first new paragraph on page 10 of the Office Action, the indication of allowable subject matter in prior claims 26, 27, 31, 32, 34 to 36, 38 and 40 is appreciated. As mentioned above, the rejection under 35 USC §112, second paragraph has been obviated or overcome. Also, claims 26, 27 and 40 have each been amended into independent form by incorporating the subject matter of prior claim 21 and any intervening claim as applicable. Thus, claims 26, 27 and 40 should now each be allowable. Furthermore, for the reasons discussed below, it is respectfully submitted that all other claims should now also be allowable.

7) In the Office Action, the Examiner refers to copies of Fig. 21 of US Patent 5,014,484 (Tanizawa et al.) that have been marked with various colors to identify the various elements of the structure. While it was a good idea to use such colors for reference, unfortunately the copies of Tanizawa Fig.21 actually enclosed with the Office Action were black-and-white photocopies, not showing distinguishable colors. This Response is being made without a clear understanding of what elements are being referenced, for lack of the colored copies of Fig. 21. Several telephone calls to the Examiner were unsuccessful in obtaining color copies of Fig. 21, or a clarification of what colors identify what elements. Thus, the present Response is based on applicant's understanding of the rejection without the benefit of the color copies of Fig. 21.

8) Referring to page 4 of the Office Action, the rejection of claims 21 and 41 as anticipated by US Patent 5,014,484 (Tanizawa et al.) is respectfully traversed.

Claim 21 has been amended to clarify the "tension-only connecting element" (which connects a joint of a third joint set (e.g. 109, 122) to at least one joint of a first joint set (e.g. 114, 115, 121, 126) and to at least one further joint), and to make clear that the joint of the third joint set (109, 122) is **NOT** on an outside corner of the module. Such a location, connection and cooperation of a third set joint with a tension-only connecting element is not disclosed by Tanizawa et al., as will be discussed in detail below.

Furthermore, amended claim 21 recites that the guide mechanism interconnecting the joints of the first joint set with the joints of the second joint set comprises **scissors arrangements** (exemplified by the scissors arrangements having scissors joints 127 to 134 in Fig. 3; also see the specification at page 15, lines 22 to 26; and page 18, lines 1 to 8; for example). Such scissors arrangements of the guide mechanism are originally supported and defined in further detail in claims 28 and 29. It is noted that claims 28 and 29 had not been rejected in view of Tanizawa et al., because the Examiner has recognized that these features of the scissors arrangements of the guide mechanism are neither disclosed nor would have been suggested by Tanizawa et al. Particularly, Tanizawa et al. do not disclose any type of guide mechanism, much less with scissors arrangements, that constrain and fix a position of the joints of the first and second joint sets relative to one another (see e.g. present specification page 15, lines 22 to 26).

Also, it is important to recognize that the structural arrangement recited in claim 21 relates to the construction of a **SINGLE module**. While several of such modules may be connected together (see certain dependent claims, e.g. claim 32) to make an overall structure, in any event, the single module has the construction defined in claim 21.

In contrast, the Examiner is referring to components of **several interconnected modules** rather than a **single individual module** with reference to Fig. 21 of Tanizawa et al. Particularly, Fig. 21 of Tanizawa et al. shows a structure

resulting from **four modules that are connected together** (see e.g. col. 4, lines 56 to 59 and col. 10, lines 36 to 51). Note that the **single module by itself is shown in Fig. 19 of Tanizawa et al.** (see col. 4, lines 51 to 53; and col. 10, lines 1 to 3). It is respectfully submitted that the analogies or comparisons asserted by the Examiner between the structure of Tanizawa et al. and the present invention fail especially when considered with respect to a single module as shown in Fig. 19 of the reference. In other words, the single module as shown in Fig. 19 according to Tanizawa et al. does not have and would not have suggested the components and the arrangement and cooperation of the components as defined for a single module in present claim 21.

The single module according to Tanizawa et al. (Fig. 19) includes only a single "first coupler 3a" which might be called a joint of a first joint set lying in a first surface. Thus, there is only one joint rather than plural joints of a first joint set in a single module. For this reason, the overall module according to Tanizawa et al. is already significantly different from the overall module according to the present invention.

Furthermore, while it is true that the module according to Tanizawa et al. includes tension-only connecting elements (27, 28, 30), these tension-only connecting elements are **not** connected to joints as recited in present independent claim 21. Claim 21 requires that the joint of the third joint set is connected by a tension-only connecting element to at least one joint of the first set and to at least one further joint, and that the joint

of the third joint set lies off of the first surface, lies below a lowermost joint of the first joint set to which it is connected, and is not at an outside corner of the module. With these limitations, neither the first coupler (3a), nor the third couplers (3c), nor the fourth coupler (3d) of Tanizawa et al. can be regarded as a joint of a third joint set located according to the invention of present claim 21. For example, the third couplers (3c) are all located at corners of the module as shown in Fig. 19. Furthermore, the second coupler (3b) of Tanizawa et al., while not being located at a corner of the module, is not connected to a tension-only connecting element, so it also cannot be regarded as the present joint of the third joint set.

Thus, in the Tanizawa et al. structure, there is **NO** joint of a third joint set located as presently claimed and connected by tension-only connecting elements to a joint of a first joint set and to at least one further joint. This is the case when referring to a single module of Fig. 19 of the reference, or plural modules according to Fig. 21 of the reference. Namely, even if the Examiner refers to the multi-module structure of Fig. 21, then it remains clear that these features of the invention are still distinguishable from the reference. There is no correspondence between Tanizawa et al. and the present invention of claim 21 (or its dependent claim 41).

For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 21 and 41 as anticipated by Tanizawa et al.

9) Referring to pages 5 to 7 of the Office Action, the rejection of claims 21 to 25, 28, 29, 33 and 37 as obvious over US Patent 4,970,841 (Zeigler) is respectfully traversed.

Applicant's remarks and arguments distinguishing the present invention from the disclosure of Zeigler, as set forth in the prior Response of March 3, 2004, are incorporated herein by reference and expressly reasserted. The Examiner is respectfully requested to reconsider those prior arguments in view of the above discussed clarification of which elements in the inventive structure are the "tension-only connecting elements". Namely, in the Final Office Action, the Examiner has raised questions as to which elements are properly regarded as the "tension-only connecting elements" in the example embodiment of the inventive structure shown in the present drawings and described in the written description. As has been discussed above, the tension-only connecting elements are exemplified by the elements (39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67 and 69) in Figs. 2, 3 (wherein they are unnumbered) and 5. With this clarified understanding of the present invention, it is respectfully submitted that the distinctions between the invention and the disclosure of Zeigler will also become more clear.

The Examiner has acknowledged that Zeigler does not specify exactly which elements are under tension or under compression, or both. The Examiner has asserted, however, that "*it would have been obvious from one having ordinary skill in he art at the time the invention was made that at least one embodiment of ZEIGLER*

includes all joint connections that transmits essentially only tension forces". In this regard, the Examiner refers to col. 3, lines 13 to 16 of the reference. This assertion is respectfully traversed.

First, it should be noted that the cited portion of Zeigler refers only to the rigidifying elements (col. 3, lines 13 to 14) added to an overall structure made up of several modules. Note that these rigidifying elements are separate additional elements rather than components of the modules themselves (see col. 3, lines 11 to 13 referring to "a structural framework comprising a plurality of modules **and** rigidifying elements which allow control over the distribution of forces within the framework" (emphasis added).

It is essentially correct, as asserted by the Examiner, that a person of ordinary skill in the art would recognize which components of a module according to Zeigler would be under compression, and which components might be only under tension. That, however, does **NOT** mean that "*at least one embodiment of ZEIGLER includes all joint connections that transmits essentially only tension forces*" as asserted by the Examiner. To the contrary, a person of ordinary skill in the art would have immediately recognized that such an alleged embodiment would have been completely non-functional and thus not suggested, motivated or enabled. As a mental construct for understanding the tension-only connecting elements, imagine embodying such elements as a fine string. Such a string is clearly able to transmit only tension forces. If one would have attempted to construct the

module according to Zeigler using only string rather than "struts" as required by Zeigler, it is immediately apparent that the structure made only of string would have collapsed under its own weight, and would not have been capable of carrying any load (see, for example, Figs. 1, 3 and 4 of Zeigler). It is absolutely clear, that the "struts" of Zeigler must be able to transmit compression (for the reasons explained in applicant's previous Response). There is no sensible, functional alternative embodiment in which "*all joint connections ... transmit essentially only tension forces*" as asserted by the Examiner.

Moreover, the Examiner's assertion that "*The selection of which joints that are tensioned would have been an obvious matter of design choice that would depend upon the part of the structure requiring the least or greatest amount of control while being expanded or contracted*" is respectfully traversed. This assertion entirely overlooks the most important consideration, which is the statics of the deployed structure, namely the static force considerations of which structural elements must carry compression loads, which structural elements must carry tension loads, and which structural elements must carry bending loads, for example, in order to make the deployed structure stable and able to carry its own weight load, and optionally carry an applied working load. Such consideration of the statics of the structure of Zeigler makes clear that the various strut elements must carry compression loads, as explained in applicant's previous Response.

Once again, as mentioned above, applicant's remarks and arguments set forth in the previous Response of March 3, 2004, especially in section 10 at pages 20 to 24, are expressly incorporated herein by reference and are reasserted. The Examiner is respectfully requested to review and reconsider those remarks and arguments.

For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 21 to 25, 28, 29, 33 and 37 as obvious over Zeigler.

10) Referring to pages 7 and 8 of the Office Action, the rejection of claims 30 and 39 as obvious over Zeigler is respectfully traversed. Claims 30 and 39 depend from claim 21, which has been discussed above in comparison to Zeigler. Thus, claims 30 and 39 are patentable already in view of their dependence. Moreover, regarding claim 30, while it may be true that the specific absolute diameter of a component is selectable as a matter of design choice, the Examiner has not addressed the relative diameters and strengths of the components as defined in present claim 30. Namely, such a greater load capacity and larger diameter of one connecting element relative to another connecting element is not merely an obvious design choice, but rather a technical distinction that would require an inventive suggestion. The Examiner has shown no suggestion or teaching in the prior art of making certain connecting elements to have a greater load capacity and a larger diameter than other connecting elements. In the Zeigler structure, the several strut elements appear to

have the same diameter, and there would have been no suggestion to proceed otherwise. For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 30 and 39.

11) Referring to pages 8 to 10 of the Office Action, the rejection of claims 42 to 48 as obvious over Tanizawa et al. is respectfully traversed.

12) Independent claim 42 has been amended to clarify the meaning of the tension-only connecting elements, to recite that the third joint is not located at a corner of the module, and to recite that the guide mechanism comprises scissors arrangements that constrain the position of some of the first and second joints relative to one another.

It is important to note that the structure defined in present claim 42 is the structure of a single module (as discussed above with respect to claim 21 as well). In contrast, the Examiner is referring to elements of several interconnected modules as shown in Fig. 21 of Tanizawa et al. (see e.g. col. 4, lines 56 to 59 and col. 10, lines 36 to 51). Note that the single module by itself is shown in Fig. 19 of Tanizawa et al. (see col. 4, lines 51 to 53; and col. 10, lines 1 to 3). If one refers to the single module shown in Fig. 19 of Tanizawa et al., it is apparent that the module is significantly different from the present invention.

For example, the single module of Tanizawa et al. has only a single first coupler (3a) at a first surface (upper surface) thereof. To the contrary, present claim 42 requires a plurality of first joints located at first corners of the module in a first surface.

Moreover, present claim 42 makes clear that the third joint is not located at a corner of the module. Thus, the first coupler (3a) and the third couplers (3c) of Tanizawa et al. cannot be regarded as the presently claimed "third joint".

Present claim 42 also recites that the third joint is connected by two tension-only connecting elements to at least two selected joints that include at least one of the first joints and at least one further joint among the first and second joints. In other words, the third joint must be connected by a tension-only connecting element to at least one of the first joints and must be connected by another tension-only connecting element to at least one more of the first or second joints. This is another reason why the various couplers according to Tanizawa et al. cannot be compared to the present invention. For example, the fourth coupler (3d) is not connected to the first coupler (3a) by a tension-only connecting element. Similarly, the second coupler (3b) is not connected to the first coupler (3a) (or to anything at all) by any tension-only connecting element. So the second coupler (3b) and the fourth coupler (3d) also cannot be regarded as the presently claimed third joint.

Furthermore, there would have been no suggestion or motivation, and no enabling disclosure, that would have prompted

a person of ordinary skill in the art to modify the structure according to Tanizawa et al. in a manner similar to the present invention. Tanizawa et al. make expressly clear which connecting elements (27, 28, 30) must be tension-only connecting elements and which connecting elements (10, 26) must be adapted to transmit compression loads. Any deviations from such requirements would have resulted in a non-functional structure. Thus, the modifications toward the inventive structure would not have been obvious.

Furthermore, present amended claim 42 recites that the guide mechanism comprises **scissors arrangements** interconnecting and constraining the relative positions of at least some of the first and second joints (exemplified by the scissors arrangements having scissors joints 127 to 134 in Fig. 3; also see the specification at page 15, lines 22 to 26; and page 18, lines 1 to 8; for example). Such scissors arrangements of the guide mechanism are originally supported and defined in further detail in claims 28 and 29. It is noted that claims 28 and 29 had not been rejected in view of Tanizawa et al., because the Examiner has recognized that these features of the scissors arrangements of the guide mechanism are neither disclosed nor would have been suggested by Tanizawa et al. Particularly, Tanizawa et al. do not disclose any type of guide mechanism, much less with scissors arrangements that constrain and fix a position of the first and second joints relative to one another (see e.g. present specification page 15, lines 22 to 26).

13) For the above reasons, present independent claim 42 is patentably distinguishable over Tanizawa et al. The dependent claims recite additional features that further distinguish the invention over the prior art, for example as follows.

Referring to claims 43 and 44, Tanizawa et al. would not have suggested the particular interconnections of joints by tension-only connecting elements as defined in these claims. For example, in contrast to claim 44, a single module of Tanizawa et al. does not include three first joints on a first plane and one second joint on a second plane connected by four tension-only connecting elements to a single third joint located as presently claimed.

Regarding claim 46, each one of the recited tension-only connecting elements extending between a given pair of joints, by itself, respectively comprises two wires or cables that extend parallel to each other. In this regard, the Examiner has referred to cables or wires that are (distantly) parallel to each other, but that do not extend between the same pair of joints, so that there is no single tension-only connecting element that connects together two joints and that itself comprises two parallel wires or cables. The fact that two parallel wires or cables respectively interconnect two separate pairs of joints is irrelevant to the claimed feature in which a single pair of joints is interconnected by two parallel wires or cables. For example see the two cables 51 or the two cables 57 in present Fig. 13. Similar considerations apply to present claim 48.

14) For the above reasons, the invention of present claims 42 to 48 would not have been obvious over Tanizawa et al., and the Examiner is respectfully requested to withdraw the rejection of these claims.

15) Favorable reconsideration and allowance of the application, including all present claims 21 to 48, are respectfully requested.

Respectfully submitted,

Gerhard RUECKERT
Applicant

By Walter F. Fasse
Walter F. Fasse
Patent Attorney
Reg. No.: 36132
Tel. 207-862-4671
Fax. 207-862-4681
P. O. Box 726
Hampden, ME 04444-0726

WFF:ar/4299
RCE Form,
Credit Card Form (PTO-2038),
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Walter F. Fasse 12/1/04

Name: Walter F. Fasse - Date: December 1, 2004